

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE
in its capacity as elected Office

Date of mailing (day/month/year)

08 February 2001 (08.02.01)

International application No.

PCT/IB00/00408

Applicant's or agent's file reference

International filing date (day/month/year)

14 March 2000 (14.03.00)

Priority date (day/month/year)

15 March 1999 (15.03.99)

Applicant

POPOV, Sergey

1. The designated Office is hereby notified of its election made:

☒

in the demand filed with the International Preliminary Examining Authority on:

10 October 2000 (10.10.00)

☐

in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Juan Cruz

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF RECEIPT OF RECORD COPY

(PCT Rule 24.2(a))

From the INTERNATIONAL BUREAU

To:

GOLDSTEIN, Stuart, M.
Hollstein Keating Cattell Johnson
& Goldstein P.C.
Willow Ridge Executive Office Park
Suite 301
750 Route 73 South
Marlton, NJ 08053
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year) 24 May 2000 (24.05.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference	International application No. PCT/IB00/00408

The applicant is hereby notified that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

POPOV, Sergey (all designated States)

International filing date : 14 March 2000 (14.03.00)

Priority date(s) claimed : 15 March 1999 (15.03.99)

Date of receipt of the record copy
by the International Bureau : 02 May 2000 (02.05.00)

List of designated Offices :

AP : GH,GM,KE,LS,MW,SD,SL,SZ,TZ,UG,ZW

EA : AM,AZ,BY,KG,KZ,MD,RU,TJ,TM

EP : AT,BE,CH,CY,DE,DK,ES,FI,FR,GB,GR,IE,IT,LU,MC,NL,PT,SE

OA : BF,BJ,CF,CG,CI,CM,GA,GN,GW,ML,MR,NE,SN,TD,TG

National : AE,AL,AM,AT,AU,AZ,BA,BB,BG,BR,BY,CA,CH,CN,CR,CU,CZ,DE,DK,DM,EE,ES,FI,GB,
GD,GE,GH,GM,HR,HU,ID,IL,IN,IS,JP,KE,KG,KP,KR,KZ,LC,LK,LR,LS,LT,LU,LV,MA,MD,MG,MK,
MN,MW,MX,NO,NZ,PL,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,TZ,UA,UG,US,UZ,VN,YU,ZA,
ZW

ATTENTION

The applicant should carefully check the data appearing in this Notification. In case of any discrepancy between these data and the indications in the international application, the applicant should immediately inform the International Bureau.

In addition, the applicant's attention is drawn to the information contained in the Annex, relating to:

☒ time limits for entry into the national phase

☒ confirmation of precautionary designations

☒ requirements regarding priority documents

A copy of this Notification is being sent to the receiving Office and to the International Searching Authority.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 740.14.35	Authorized officer: Maria Victoria CORTIELLO Telephone No. (41-22) 338.83.38
--	--

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING AMENDMENTS OF THE CLAIMS

(PCT Rule 62 and
Administrative Instructions, Section 417)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as International Preliminary Examining Authority

Date of mailing (day/month/year)

08 February 2001 (08.02.01)

International application No.

PCT/IB00/00408

International filing date (day/month/year)

14 March 2000 (14.03.00)

Applicant

POPOV, Sergey

The International Bureau hereby informs the International Preliminary Examining Authority that no amendments under Article 19 have been received by the International Bureau (Administrative Instructions, Section 417).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 740.14.35

Authorized officer

Juan Cruz

Telephone No. (41-22) 338.83.38

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
21 September 2000 (21.09.2000)

PCT

(10) International Publication Number
WO 00/54648 A3

(51) International Patent Classification⁷: A61M 5/00

(21) International Application Number: PCT/IB00/00408

(22) International Filing Date: 14 March 2000 (14.03.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
128989 15 March 1999 (15.03.1999) IL

(71) Applicant and
(72) Inventor: POPOV, Sergey [IL/IL]; P.O. Box 4583, 84144
Be'er Sheva (IL).

IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU,
LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT,
RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA,
UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent
(AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent
(AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU,
MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GW, ML, MR, NE, SN, TD, TG).

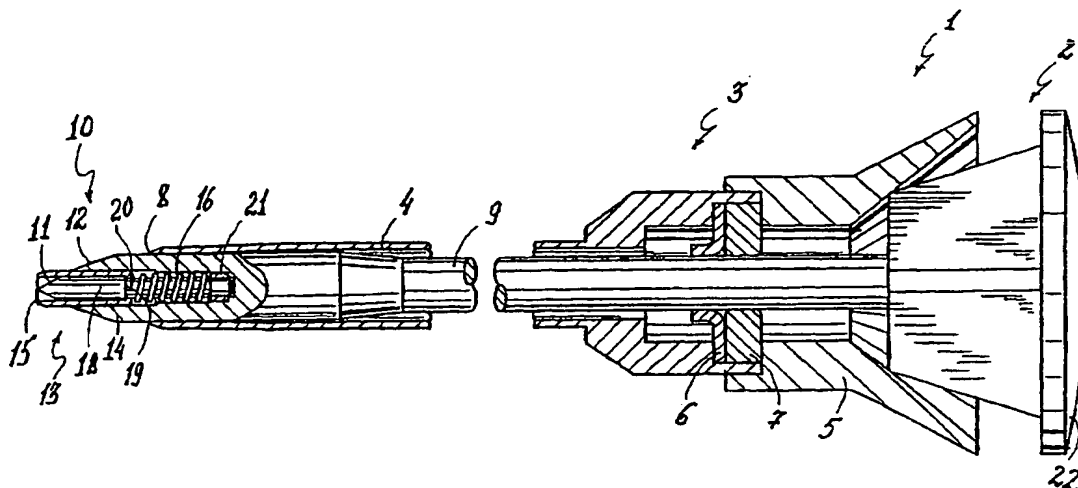
Published:
— With international search report.

(88) Date of publication of the international search report:
11 January 2001

(81) Designated States (*national*): AE, AL, AM, AT, AU, AZ,
BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK,
DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL,

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: SAFETY TROCAR ASSEMBLY



(57) Abstract: A trocar assembly includes a low-profile retractable shield (14) deployed immediately adjacent to a cutting element (10) with a cross-sectional area which is small relative to the total cross-section of the assembly. In preferred examples, the total cross-sectional area protected by the shield element is less than about 0.4, and most preferably less than about 0.2, of the total cross-sectional area of the assembly. As a result, the shield extends itself as soon as the cutting element clears the tissue wall, prior to penetration of the remainder of the end portion of the assembly. Optionally, such a shield may be used in combination with a conventional, large-area shield to provide two-stage protection. Implementations of this principle, together with various locking mechanisms and additional features, are described in the context of various trocar configurations.



WO 00/54648 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB00/00408

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61M 5/00

US CL : 604/164.01

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 604/164.01, 164.02-164.07, 264: 606/185, 171-184

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,556,411 A (TAODA et al.) 17 September 1996, see entire document.	1-95
A	US 5,690,663 A (STEPHENS) 25 November 1997, see entire document.	1-95
A	US 5,246,425 A (HUNSBERGER et al.) 21 September 1993, see entire document.	1-95
A	US 5,591,190 A (YOON) 07 January 1997, see entire document.	1-95



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

30 SEPTEMBER 2000

Date of mailing of the international search report

13 OCT 2000

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

JOHN D. YASKO *Diane Smith for*

Telephone No. (703) 308-2986

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : A61B	A2	(11) International Publication Number: WO 00/54648 (43) International Publication Date: 21 September 2000 (21.09.00)
(21) International Application Number: PCT/IB00/00408 (22) International Filing Date: 14 March 2000 (14.03.00) (30) Priority Data: 128989 15 March 1999 (15.03.99) IL (71)(72) Applicant and Inventor: POPOV, Sergey [IL/IL]; P.O. Box 4583, 84144 Be'er Sheva (IL).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>Without international search report and to be republished upon receipt of that report.</i>
(54) Title: SAFETY TROCAR ASSEMBLY		
(57) Abstract <p>A trocar assembly includes a low-profile retractable shield deployed immediately adjacent to a cutting element with a cross-sectional area which is small relative to the total cross-section of the assembly. In preferred examples, the total cross-sectional area protected by the shield element is less than about 0.4, and most preferably less than about 0.2, of the total cross-sectional area of the assembly. As a result, the shield extends itself as soon as the cutting element clears the tissue wall, prior to penetration of the remainder of the end portion of the assembly. Optionally, such a shield may be used in combination with a conventional, large-area shield to provide two-stage protection. Implementations of this principle, together with various locking mechanisms and additional features, are described in the context of various trocar configurations.</p>		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

PCT

(PCT Article 36 and Rule 70)

REC'D 31 AUG 2001

Applicant's or agent's file reference 2015.00003		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/IB00/00408	International filing date (day/month/year) 14 March 2000 (14.03.2000)	Priority date (day/month/year) 15 March 1999 (15.03.1999)	
International Patent Classification (IPC) or national classification and IPC IPC(7): A61M 5/00 and US Cl.: 604/164.01			
Applicant POPOV, SERGEY			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>5</u> sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application 			
Date of submission of the demand 10 October 2000 (10.10.2000)		Date of completion of this report 26 June 2001 (26.06.2001)	
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230		Authorized officer <i>Michael J. Hayes</i> Telephone No. 703-308-0858	

Form PCT/IPEA/409 (cover sheet)(July 1998)

RECEIVED

DEC 31 2001

TECHNOLOGY CENTER R3700

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/IB00/00408

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed.
- ☒ the description:
pages 1-38 _____ as originally filed
pages NONE _____, filed with the demand
pages NONE _____, filed with the letter of _____.
- ☒ the claims:
pages 39-49 and 51-54 _____, as originally filed
pages NONE _____, as amended (together with any statement) under Article 19
pages NONE _____, filed with the demand
pages 50,55 and 56 _____, filed with the letter of 15 MAY 2001 (15.05.2001)
- ☒ the drawings:
pages 1-25 _____, as originally filed
pages NONE _____, filed with the demand
pages 26, 27 _____, filed with the letter of 15 May 2001 (15.05.2001)
- ☒ the sequence listing part of the description:
pages NONE _____, as originally filed
pages NONE _____, filed with the demand
pages NONE _____, filed with the letter of _____.

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages None
- ☒ the claims, Nos. None
- ☒ the drawings, sheets/fig None

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

WRITTEN OPINION

International application No.
PCT/IB00/00408

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims <u>3-8, 10-55, 57-62, 64-92, 94 and 95</u>	YES
	Claims <u>1, 2, 9, 56, 63, 93</u>	NO
Inventive Step (IS)	Claims <u>39-55, 95</u>	YES
	Claims <u>1-38, 56-94</u>	NO
Industrial Applicability (IA)	Claims <u>1-95</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

Claims 1, 2, and 9 lack novelty under PCT Article 33(2) as being anticipated by HUNSBERGER et al. Hunsberger et al. disclose all the claimed elements including penetrating apex, protector means, and biasing means. In letter of 15 May 2001 Applicant argues that individual projections are not disclosed by Hunsberger; however such a limitation is not recited in the claims.

Claims 56, 63, and 93 lack novelty under PCT Article 33(2) as being anticipated by STEPHENS. Stephens discloses, inter alia, a knife having a blunt apex and cutting means proximally situated to the blunt apex, as seen best in Fig. 4. Additionally Stephens discloses the proximal end of the knife is located proximally of the distal point of sleeve 34 sloping edge. In letter of 15 May 2001 Applicant points out demerits of the prior art; however the prior art discloses the recited limitations of the claimed invention.

Claims 57-62, 64-67, 78-92, and 94 lack an inventive step under PCT Article 33(3) as being obvious over STEPHENS. The particulars recited in the dependent claims merely contain limitations that would be obvious to one of ordinary skill in the art to incorporate with the features disclosed by Stevens. In letter of 15 May 2001 Applicant points out limitations concerning the protector thickness width, and perimeter as well as limitations to the knife cutting line of his invention. Such changes in size relationships between the various elements would be obvious to the skilled artisan to achieve a desired objective.

Claims 3-8, and 10-38 lack an inventive step under PCT Article 33(3) as being obvious over HUNSBERGER et al. The claims contain limitations that would be obvious to one of ordinary skill in the art to incorporate with the invention of Hunsberger.

Claims 68-74 lack an inventive step under PCT Article 33(3) as being obvious over MOREJON. Morejon discloses an inflatable internal cuff and exterior flanged restraining means. It would be obvious to one of ordinary skill in the art to incorporate the particulars claimed in the dependent claims with the invention disclosed by Morejon. The use of elastic expandable material for cuffs is well known in the art.

Claims 75-77 lack an inventive step under PCT Article 33(3) as being obvious over HUNSBERGER et al. in view of MOREJON. Hunsberger discloses a locking mechanism for a trocar shield but does not disclose an inner sealing means. Morejon discloses the sealing means and together the references teach the limitations of the claimed invention. The interrelatedness of the locking mechanism, obturator, and sleeve is seen as the locking mechanism prevents sleeve movement when in the locking position.

Claims 39-55 and 95 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest independently movable protector members as claimed.

----- NEW CITATIONS -----

US 5,713,869 A (MOREJON) 03 FEBRUARY 1998, See Figs 1-3 and related text.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/IB00/00408

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

Claim 1 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 1 is indefinite for the following reason(s): there is no antecedent basis for "said shield segments" in claim 1.

IPCAUS 15 MAY 2001

constituted by the plane intersecting said cutting edge and said longitudinal central axis;

65. Device according to Claim 64, wherein said cutting plane is the symmetry plane of said sloping edge.

66. Device according to Claim 63, wherein there are more than one said cutting edge having differing said cutting planes.

67. Device according to Claim 66, wherein the number of said sloping edges corresponds to the number of said cutting planes

68. Trocar assembly comprising:

- portal with elongated tubular cannula and portal unit mounting means for mounting said portal unit in orifice of body cavity wall which has inner mounting means made as inflated cuff mounted on said tubular cannula, and there is connector means for said cuff connection to the external gas supply, said cuff being formed of an elastic expandable material.

69. Device according to Claim 68, wherein there is an outer mounting means comprising restraining member movable along said tubular cannula, and resistance means precluding spontaneous proximal displacement of said restraining member.

70. Device according to Claim 69, wherein said restraining member has a flange and an orifice said tubular cannula passes through, and said resisting means is made as engagement means and has restraining member engagement protrusions situated on inner of said orifice, and tubular cannula engagement protrusions situated on outer surface of said tubular cannula.

71. Device according to Claim 68, wherein said connection means comprises connector with rebound valve and a passage connecting said connector and said cuff and passing through the wall of said tubular cannula.

PEA/US 15 MAY 2001

- penetrating means situated on said penetrating end;

- a protector means for said penetrating means having at least one shield situated on said obturator and adapted to actuate between a retracted and an extended position when said shield protects said penetrating means;

5 - shield open part, this being the part of said shield which when said protector means is in said retracted position, is situated distally of the plane perpendicular to said longitudinal central axis and intersecting the proximal point of the section of outer surface of said shield protruding beyond the bounds of the members of said trocar assembly immovable with regard to said penetrating means and located distally of said cannula open distal end;

10 - common projection of outer surfaces of the members of said trocar assembly situated distally of said cannula open distal end onto the plane perpendicular to said longitudinal central axis, having the center in the intersect point of said plane and said longitudinal central axis;

- projection width of said shield and as such serves the distance between said common projection center and its most remote point on said shield projection outline;

15 - relative projection width of said shield outer outline which is the ratio of said projection area of shield outer outline to the area of the circle with radius equal to said projection width of said shield so that said relative projection area of said shield outer outline is always less than 0.4.

20 92. Device according to Claim 91, wherein said relative projection area of shield outer outline is less than 0.2.

93. A safety trocar assembly comprising:

25 - trocar unit with penetrating means having at least two penetrating zones distal and proximal - each of which has independent of each other responsive means which provide penetration of body tissue at the level of said proximal penetration zone occurs under higher tissue tension than penetration of tissue at the level of said distal penetration zone.

94. Device according to Claim 93, wherein said responsive means is presented in the form of said penetrating means which at the level of said distal and proximal zones are made as cutting

55,

HOEAMEN CLEFT.

PEANUS 15 MAY 2001

members so that said distal cutting member is made sharper than said proximal cutting member.

95. Device according to Claim 93, wherein said responsive means are made in the form of protector member for each of said penetrating zones so that the displacement of said proximal protector member from the extended to the retracted position demands greater effort than the displacement of said distal protector member.

26/27

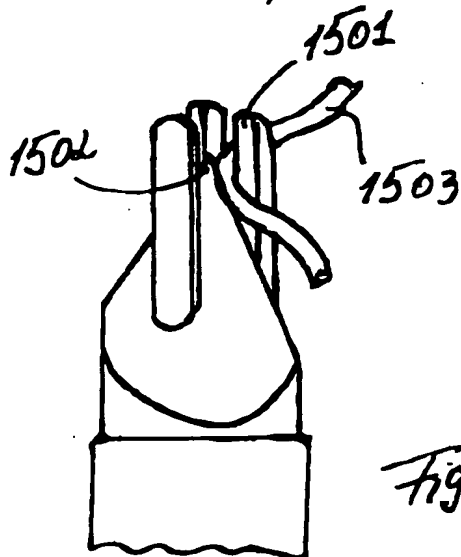


Fig. 95

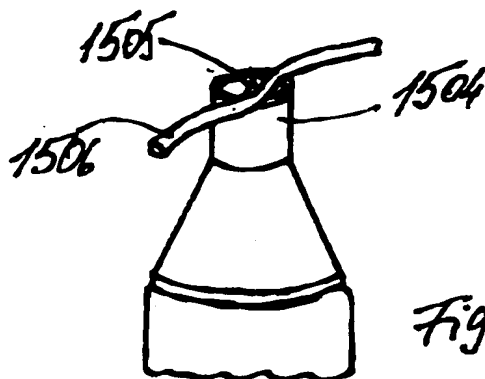


Fig. 96

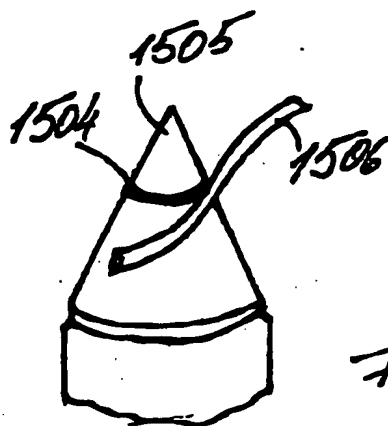


Fig. 97

27/27

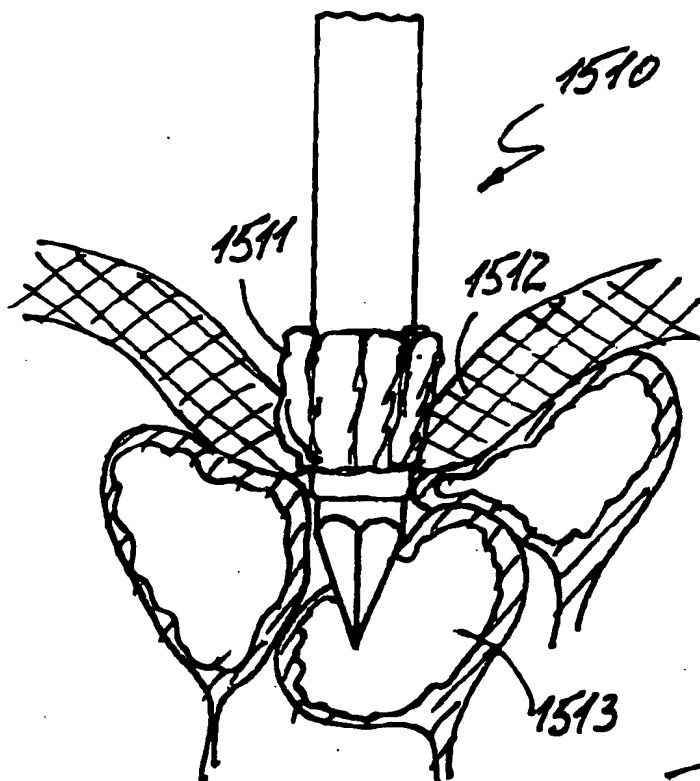


Fig. 98